

The Beaver Lake Monitor

A publication of the Beaver Lake Management District Advisory Board

www.beaverlake.org

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Stormwater Ponds: Reducing Pollution in the Beaver Lake Management District

Protecting water quality. Preventing flooding. Maintaining our ecosystem. There is a lot happening in that unassuming stormwater pond you may have noticed behind your house, along your jogging route or while you were walking your dog.

Stormwater ponds accomplish all this by reducing pollution and the rate of water runoff from new developments.

The major pollutant in the Beaver Lake Management District (LMD) is phosphorus, which degrades the lake's habitat quality by encouraging algae blooms. Phosphorus is often associated with large amounts of soil eroding from a new development. The faster water flows as it leaves a new development, the more soil it carries to the water.

New developments typically contain large areas of impervious surfaces (e.g. roads, driveways and houses) which do not absorb water. In order to prevent water from running down the street and across adjacent properties, it is rerouted to stormwater ponds.

There are two major stormwater control features — settling ponds and sand filters — used to reduce the phosphorus content in water runoff from a development.

The primary purpose of the settling pond is to slow the storm-

water enough that soil and sediments trapped within the water can settle to the bottom of the pond. Sand filters operate in essentially the same fashion by trapping nutrients within the sand.

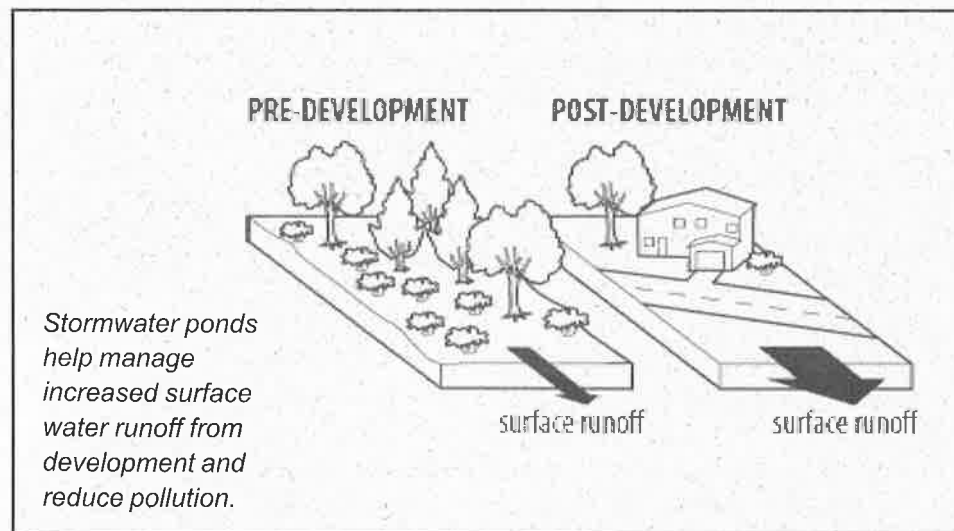
Water leaving the stormwater ponds is regulated by design to mimic the original flow rates that existed prior to development.

For example, the Wesley Park development includes a large stormwater pond north of 24th Avenue Southeast that has three separate outlet pipes located at different elevations in order to accommodate outflow. When 5.5 feet of water accumulates in the pond, the water level reaches a 3.8" diameter outflow pipe that discharges directly to laughing Jacobs Creek. If heavy rains increase water levels to 9.5 feet,

additional outflow begins through a 4" diameter pipe that discharges to Beaver Lake at the northeast corner of Beaver Lake Park. The total vertical capacity of the stormwater pond is 14 feet. If the pond fills to that point, a 24" diameter overflow pipe directs excess water to the outflow at Beaver Lake Park to avoid flooding at the stormwater ponds site.

Next time you pass a stormwater pond, take a second look. There's a lot going on under the surface.

If you have questions or would like more information about the stormwater ponds in the Beaver Lake Management District, please call Eric LaFrance, City of Sammamish Drainage Engineer at 425-836-7943.



Beaver Lake Health Report: Summer Monitoring Results Show Data Similar to Recent Years

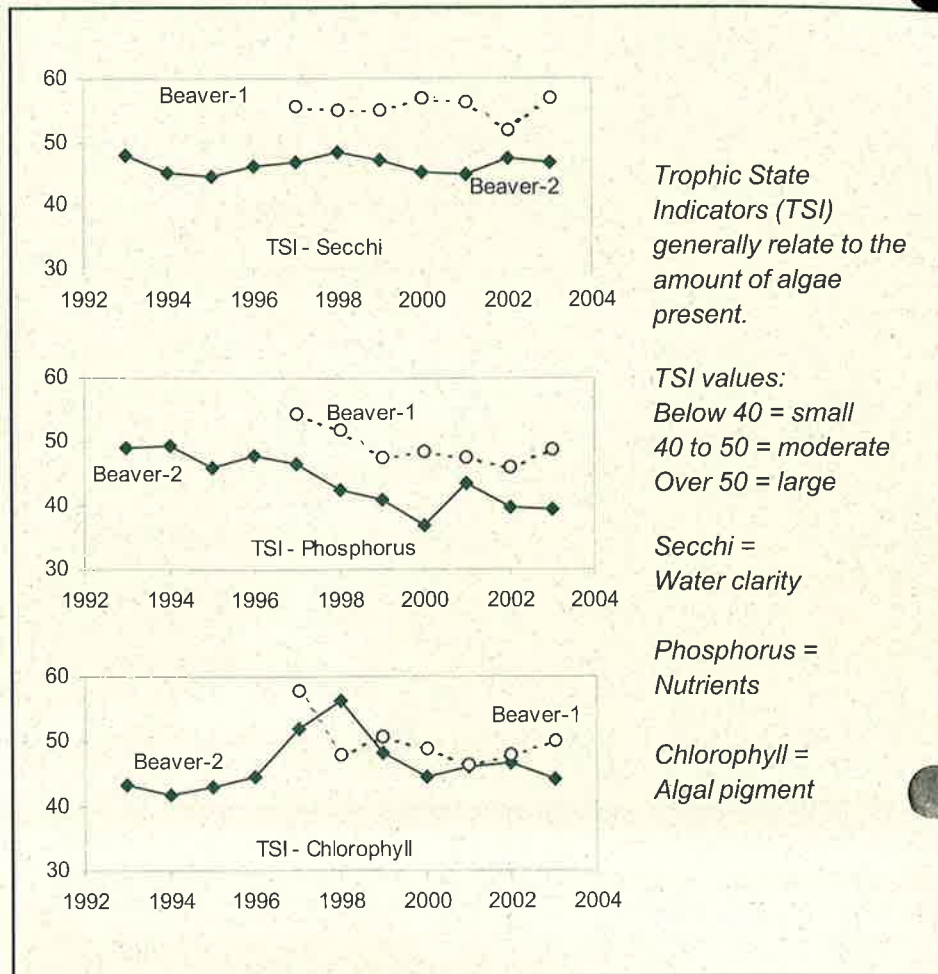
The Beaver Lake Management District (BLMD) funds monitoring of the two main creeks that flow into Beaver Lake from October through May, during which time creek flows carry sediment and nutrients into the lake. This can greatly affect water quality of the lake basins during the following summer. And watershed developments directly impact water in the creeks, and thus in the lake as well.

Though the BLMD does not have funds to follow conditions each summer, a year-round assessment will be done in 2006.

In the meantime, the King County Lake Stewardship Program recruits volunteers to provide basic water quality data each year on the Beaver-1 and Beaver-2 lake basins.

Summer monitoring runs from the end of April through late October. During this time trained volunteers go out every two weeks to measure water clarity and temperature, take water samples for nutrient and chlorophyll analyses, and record their observations — such as how many Canada geese they see. The south basin (Beaver-2) has been measured since the 1980s, while data from the north basin (Beaver-1) has been collected since 1997.

The 2003 summer season has just been completed, and although some data is not available yet, preliminary results suggest that 2003 values were quite similar to recent years. Average values for measured parameters have been converted to Trophic State Indicators (TSI), which generally relate to the amount of algae present.



A TSI value below 40 indicates small amounts of algae, values between 40 to 50 are moderate, and values above 50 indicate large amounts.

The charts for TSI-Secchi (water clarity), TSI-Phosphorus (nutrient), and TSI-Chlorophyll (algal pigment) show that while there are some differences between the two basins and from year to year, water quality has remained in the moderate range recently, except for clarity measurements in Beaver-1.

Water color can increase the TSI-Secchi, falsely indicating more algae than is actually present. This can be seen by comparing the TSI

values for Beaver-1 and Beaver-2 (see chart). Beaver-1 consistently has higher TSI-Secchi values caused by the tea-color of the water while the TSI-Chlorophyll, which is a direct measure of a pigment contained in algae cells, shows that the two basins are more comparable than the TSI-Secchi would suggest.

The general trend of decreasing TSI-Phosphorus since 1996 in both basins is likely due to development requirements calling for high levels of surface water detention and treatment before entering the creeks. (See cover article on stormwater ponds).



The Busy Beaver Kids Page

Hi kids! I'm the Beaver Lake Busy Beaver. You may have seen me around the lake. In each edition of the Beaver Lake Monitor newsletter, I'll have some puzzles, games, activities and science experiments. So look for me, both on these pages, and around the lake! Have fun! Your pal,

Busy Beaver

Word Search: Busy Beaver Makes a Friend

Busy Beaver decided to go for a swim in Beaver Lake on a sunny day. As he paddled out into the water, past a boat tied to the dock, he noticed a fish swimming nearby.

He swam up and said, "Hello there! I'm Busy Beaver. Who are you?"

"I'm Mr. T," said the silvery trout. "I live here. This is my habitat too you know."

"Do you like living in the water," asked Busy Beaver.

"Beaver Lake is a nice place to live. The water has a lot of oxygen for me to breath, but sometimes the algae can make it hard for me to see my food."

Busy Beaver knew many of the birds and critters that lived in his watershed, and he was happy to make a new friend.

See if you can find all nine of the highlighted words from the story on the left in this Word Search puzzle. Circle each word, which may appear horizontally or vertically.



Kids Page Continued...

A Beaver Lake Scavenger Hunt

Hey Kids!! Here's a scavenger hunt you can do at Beaver Lake! Take this sheet and a pencil next time you go down to the lake and check off each item as you see it. Then add up your points to see what kind of a Beaver Lake monitor you are. Remember: don't remove any of the items you see...except the litter!

☐ Bald eagle = 5

☐ Fern = 1



☐ Fish jumping = 4



☐ Mushroom = 2

☐ Douglas Fir tree = 3
(Needles are soft,
dark, blue-green, 1 -
1.5" long, and radiate in
all directions.)

☐ Blackberry bush = 1

☐ Storm drain = 1

☐ Canoe = 1



☐ Garbage can = 1

☐ Culvert = 3

☐ Maple leaf = 1

☐ Canada goose = 1

☐ Pine cone = 1

☐ Litter (*pick it up!*) = 0 if
you leave it; 5 if you
pick it up and throw it
away

☐ Duck = 2

☐ Slug = 2



**1 - 5 points =
Beaver Lake Loafer**

You either took a short walk
or had your eyes closed! Try
again to really **see** the
things around your lake.

**6 - 15 points =
Friend of Beaver Lake**

Good job! You found a lot of
the common things at Bea-
ver Lake. Try looking a little
harder to find some of the
not so common stuff!

**16 - 28 points =
Beaver Lake Monitor**

Great observation tech-
niques! You got a good close
look at the habitat and
surroundings of Beaver
Lake.

**29 or more =
Beaver Lake Steward**

Awesome job! You really
know your way around this
lake! Your eagle eyes help
keep your environment clean.

The Beaver Lake Monitor

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Beaver Lake Community Club

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Monitoring Beaver Lake Inlets

October 1 marked the beginning of the 2004 water year. As the rain continues to fall, the creeks leading to the Beaver Lake basins will start to flow, and King County staff will begin monitoring the streams and the lakes regularly until the tributary flow into the lakes stops in early summer.

Parameters listed below will be measured on each monitoring trip.

Flow and water level:

High flow events can carry higher concentrations of nutrients and suspended solids. Development causes changes in response patterns of stream and lake levels to precipitation events.

Temperature: In addition to being handy if you're considering a swim, temperature is vital in predicting algae blooms, fish survival, and suitability for other aquatic life.

Dissolved Oxygen (DO):

Oxygen is necessary for aquatic

animals to survive. DO is supplied by photosynthesis and by water mixing with air. Animals and plants consume it, as does decomposition of organic matter (plant matter and animal waste).

pH: A measure of water acidity, pH affects what plants and animals are present. Photosynthesis can raise pH, making the water more basic, and decomposition and respiration can lower pH, making the water more acidic.

Conductivity: The ability of the water to conduct electrical current. Conductivity is often higher in heavily developed watersheds than in similar watersheds with little or no development.

Alkalinity: A measure of the ability of water to resist changes in pH or "buffer" the acids present in water. Water with high alkalinity, or buffering capacity is considered to be "hard," while low alkalinity waters are called "soft." Both basins

of Beaver Lake have soft water, and therefore are more susceptible to changes in acidity.

Total Suspended Solids (TSS):

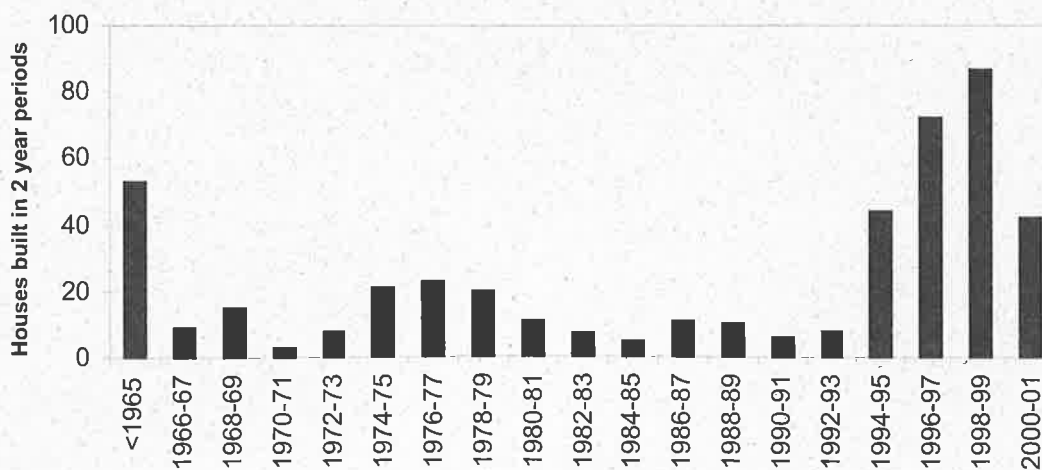
Simply put, it is the amount of "stuff" suspended in the water. Water with high levels of suspended solids often appears dirty or turbid. TSS is likely to be higher after storm events due to soil erosion.

Nutrients: Phosphorus and nitrogen are key nutrients in lakes. Too much (especially phosphorus in Beaver Lake) can increase the likelihood of nuisance algae blooms and excessive plant growth.

Limit nutrients entering the lake by picking up pet waste or by fertilizing naturally and sparingly.

If you would like to learn more about any of these parameters, or the results of current or past monitoring efforts, contact Michael Murphy at 206-296-8008 or michael.murphy@metrokc.gov.

Development in the Beaver Lake Watershed



This chart shows the number of new houses that were built every two years within the limits of the Beaver Lake watershed since 1965. The list was compiled based on the year in which houses were built, according to King County Assessor data.

Data provided by City of Sammamish based on King County information.



King County

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Wesley Pond



Wesley Pond is a stormwater pond located just north of Beaver Lake Park and west of Beaver-2 Lake. Read about why stormwater ponds are important to Beaver Lake and how they work, inside this issue.

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King County

